

OPERATION AND MAINTENANCE CONSERVATION PROGRAM - SURVEY CHECKLIST (R-2)

SITE (AGENCY OR CAMPUS) _____ BUILDING (NAME) _____

COUNTY/COMPLEX /ASSET # _____ USE (OFFICE, ETC) _____ FLOOR AREA (GSF) _____

SURVEYOR NAME _____ TEAM _____ SURVEY DATE AND TIME _____

SCORING: IN EACH OF THESE THREE AREAS, DIVIDE THE NUMBER OF YES ANSWERS BY THE TOTAL NUMBER OF ANSWERED QUESTIONS:

LIGHTING (PG 3) __ x 20 = __ ENVELOPE & HVAC (PG 3) __ x 50 = __ ALL OF PG-4 __ x 30 = __ TOTAL = L + E/H +M =

HVAC SYSTEM DATA

Room # or Area Name where thermostat is located	Interior or Exterior Zone (I or E)	Thermostat setpoint (F)	Measured temperature & RH at t-stat (75F / 50%)	Is t-stat programmable or on EMCS? If so, then note schedule.	<u>System type:</u> Roof-Top Unit = RTU Split System = SS Packaged Unit = PU Terminal Reheat = TR Dual Duct = DD Variable Volume = VV	If system is TR or DD, then note supply air temperature setpoint AND if reset manually or automatically

LIGHTING, MISCELLANEOUS EQUIPMENT, & DAYLIGHTING DATA

<u>UNOCCUPIED SPACES</u> Unoccupied rooms in which Lighting, Computers, or Other equipment were found in operation. Note items (L, C, O)	EXTERIOR LIGHTING Location & # of fixtures found in daytime operation Any decorative fixtures?	MISCELLANEOUS ELECTRICAL Rooms in which Incandescent Lamps, Personal Space Heaters or Lighted Vending Machines were found. Note items (IL, PSH, LVM)	FENESTRATION Rooms furnished with blinds that are apparently not used. <u>Unoccupied</u> rooms in which windows were found open.
Estimated % of ALL rooms found unoccupied with lights or computers in operation:		Number of illuminated EXIT signs that are not LED type:	

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(in the left margin, print 'N' for no, 'S' for some, or 'Y' for yes, or **leave blank if not applicable**)

BUILDING ENVELOPE

- Is weather stripping on windows and doors well maintained to minimize infiltration?
- Do blinds and shades appear to be adjusted to allow daylight and reject direct solar heat gain?

LIGHTING SYSTEMS

- Are fluorescent task lamps present to enable background lighting levels to be reduced?
- Are occupancy sensor controls present to automatically switch-off lights?
- Have incandescent lamps been replaced with self-ballasted fluorescents?
- Have old 34W fluorescent lamps and old ballasts been replaced with T-8 lamps and electronic ballasts?

HVAC SYSTEMS

- Are building exhaust fans switched-off with the HVAC systems for unoccupied periods?
- Are reasonable heating and cooling setpoints (70 heating, 76 cooling) maintained? Refer to the ASHRAE Thermal Comfort Table of Summer and Winter Comfort Zones. Are thermostats routinely calibrated?
- For only reheat HVAC systems, is the supply air discharge temperature automatically raised from 55F to minimize reheat energy consumption?
- Has the supply air flow from the air handling unit(s) been reduced to match the load? By controlling the speed of fan, a 10% reduction in motor speed will theoretically save 27% in energy use (if static pressure is allowed to vary).
- Has direct conditioning of unoccupied areas (corridors, stairwells, storage rooms, exhausted toilet rooms, etc) been minimized by switching-off fan coil units and unit heaters and by closing supply air diffusers?
- Has the introduction of outdoor air been minimized to the ASHRAE Standard 62-1999 recommended ventilation rates?
- Are OA dampers controlled to close during unoccupied periods?
- Are OA dampers controlled to modulate to provide free cooling (economizer) when the ambient temperature is below 65F?
- Are air filters replaced on a regular basis to ensure good airflow?
- Are steam or heating hot water pipes well insulated?
- Are steam traps and valving regularly inspected? In a well maintained plant, as many as 15% of the steam traps have likely failed. With an annual cost of \$2,000 to \$3,000 per year per failed trap, a regular steam trap survey is a good investment. Returning condensate to the boiler not only saves fuel, but also purchased water, chemicals, and any sewer charges.
- Are heat exchanger surfaces such as cooling coils, heat exchangers, and condensing units regularly cleaned?
- If a boiler is present, is the burner tuned on an annual basis?
- For cooling towers, has the concentration ratio been increased to "6" (blow-down typically ≤ 2000 ppm) to conserve water?
- Has a water meter been installed on the cooling tower to enable a sewer-charge credit?

DOMESTIC WATER SYSTEMS

- Are hot water storage tanks, heat exchangers and piping well insulated?
- Is a timer used to switch-off the hot water circulating pump for unoccupied periods?
- Are low-flow 1-GPM lavatory faucet aerators present? 2.5-GPM showerheads?
- Have flush valves on urinals and water closets been adjusted for the lowest / shortest practical flow?

COMPRESSED AIR SYSTEMS

- Is the compressed air system regularly inspected for leaks? Depending upon operating hours and local electric charges, compressed air could cost from \$35 to \$110/cfm/year.
- Is cooled air provided to the compressor? For reciprocating and dry screw compressors only, a 5° F drop in intake air temperature will result in a 1% saving in energy.
- Has the compressor discharge pressure been minimized? A 2-PSI reduction will result in a 1% saving in energy.

AC ELECTRIC MOTORS

- Are PREMIUM efficiency motors regularly purchased? Rewinding reduces efficiency and carries no efficiency guarantee.
- Are variable frequency drives controlling fans and pumps to enable flow control and improve motor protection? For centrifugal fans and pumps, a 10% reduction in motor speed will (theoretically) save 27% in energy use.
- Are cogged V-belts utilized? Cogged belts reduce slip and potentially save energy.

MISCELLANEOUS EQUIPMENT

- Has computer software been installed to automatically switch-off monitors?
- Have electric-heated defrost cycles on refrigerated walk-in boxes been minimized and scheduled for off-peak periods (night)?
- Has lighting been removed from all vending machines?
- Have refrigerated drinking fountains (water coolers) been switched-off?
- Are demand-limiting controls present on equipment that may be switched-off during peak demand periods, such as electric water heaters and condensing units? Some utility DSM programs may offer rebates for such equipment.
- Are fire pumps tested only during off-peak periods?